

**ABSTRACT OF THE DISCLOSURE**

A molecular fluorine (F<sub>2</sub>) laser system that includes a gaseous molecular fluorine gain medium contained in a laser tube, a resonant cavity, a power supply for exciting the gain medium to produce a laser beam having an ultra violet (UV) radiation output at substantially 157 nm and a red radiation output in the range of 620 to 760 nm, a discharge module connected to the laser tube for adding and withdrawing gas to the gain medium, a controller for controlling the power supply and the discharge module, and a photo diamond detector that receives a portion of the laser beam for measuring at least one optical parameter of the UV radiation such as energy, pulse energy, pulse shape, pulse width, etc. The photo diamond detector is substantially insensitive to the red radiation output that is also present in the laser beam. The controller modifies the excitation of the gain medium by the power supply, and modifies the gas added to and withdrawn from the gain medium in the laser tube by the discharge module, in response to the optical parameter measured by the photo diamond detector.